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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Application Number: 10/786,418
Filing Date: February 26, 2004
Appellant(s): BOWLES ET AL.

Gordon P. Klancnik
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/9/07 appealing from the Office action mailed 12/21/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct. The amendment to the title was not received on October 3, 2006.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Giwa et al, "Scale-Up of Lithium/Carbon Monofluoride Envelope Cells", Proceedings of the 39th Power Sources Conference, (June 2000), pp. 32-35

2003/0194604 AAMODT et al 10-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 6-15, 17-21, and 23-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Giwa et al. ("Scale-Up of Lithium/Carbon Monofluoride Envelope Cells," Proceedings of the 39th Power Sources Conference, June 2000, pp. 32-35).

Regarding claim 1, 4, 12, 13, 19, 21, 26, and 27, the Giwa reference discloses a pouch battery and a method of making the pouch battery comprising: a primary lithium/solid cathode cell where the cathode is a carbon monofluoride; an assembly formed by respectively overlaying a sheet cathode, a sheet separator, and a lithium metal sheet anode to form a stacked structure and subjected to 1 to 5 folds wherein the initial fold comprises folding the cathode sheet around a central lithium anode; and forming a pouch battery by sealing the electrode assembly in a Surlyn bag (See Introduction, Experimental, and Cell Construction). Since the cathode sheet was folded around a central lithium anode, the cathode would be folded in half around a double-sided anode sheet so as to surround the respective upper and lower active anode surfaces such that the fold line extends perpendicular to its length. Therefore, the anode sheet is half the size of the cathode sheet.

Regarding claims 2, 14-15 and 17, it is well known in the art that a double-sided anode comprises a single sheet current collector combined with either a single layer of lithium metal or two layers of lithium metal that form the upper and lower active surfaces to form a single integral anode. Since the anode sheet is half the size of the cathode

sheet, the dimensions of the anode current collector match those of the cathode when folded in half.

Regarding claims 3, the cathode and separator would have to be the same size and shape in order to prevent an electrical short between the anode and cathode.

Regarding claim 6, 7, and 23, it also discloses folding the cell 5 times, starting with a sheet that is 240 x 7.5 cm and ending with a folded construction that is 7.5 x 7.5 cm (See Cell Construction). Therefore, four subsequent folds were made upon the same side of the stacked structure with the fold line extending perpendicular to the original length of the stacked structure and its overall length is halved at each fold.

Regarding claim 8, it also discloses a battery capacity that exceeds 18 Ah (See Capacity and Energy Density table in Discussion of Results).

Regarding claims 9 and 10, it also discloses a cathode that comprises an aluminum sheet current collector and a cathode material layer where the cathode has active surface on only one side thereof, formed by the cathode material layer (See Experimental).

Regarding claims 11 and 24, it also discloses total cathode and anode capacities that are roughly matched to produce a balanced cell (See Cell Construction).

Regarding claim 18 and 25, it also discloses the cathode capacity/cm^2 is about half that of the anode capacity/cm^2 (See Experimental).

Regarding claim 20, it also discloses an electrolyte filling stage (See Cell Construction).

Regarding claim 28, it also discloses a pouch battery in which the cathode, separator, and anode sheets have been respectively overlaid on one another to form a stacked structure, and the structure has been folded in half so that its length is halved at each fold, each fold being made on the same side of the structure with the fold lines extending perpendicular to the original length (See Experimental and Cell Construction).

Regarding claim 29, it also discloses a primary lithium/solid cathode pouch battery comprising an electrode assembly formed by respectively overlaying a sheet cathode, a sheet separator and a double-sided sheet anode to form a stacked structure, and subjecting the stacked structure to multiple folds, wherein the initial fold comprises folding the cathode in half around the double-sided anode so as to surround the respective upper and lower active anode surfaces thereof, and wherein one or more successive folds comprises folding the stacked structure so its overall length is halved with each fold, the fold lines being made perpendicular to that length (See Introduction, Experimental, and Cell Construction).

Claims 16 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giwa et al. ("Scale-Up of Lithium/Carbon Monofluoride Envelope Cells," Proceedings of the 39th Power Sources Conference, June 2000, pp. 32-35) in view of Aamodt et al (US 2003/0194604). The Giwa reference is applied to claims 1, 14, and 15 for reasons stated above. In addition, Giwa et al also discloses a central lithium anode which inherently is double-sided.

However, Giwa et al does not expressly teach a current collector in the form of a mesh or grid with the lithium foil occupying the openings to form a double sided lithium

anode. The Aamodt reference discloses a metal grid that functions as a current collector that forms a cohesive bond between two lithium foils that could be used to form a double-side lithium anode (See paragraph [0013]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Giwa battery to include a current collector in the form of a mesh or grid with the lithium foil occupying the openings to form a double sided lithium anode in order to stabilize and reinforce the cohesive bond between the lithium foils.

(10) Response to Argument

Regarding the 102 rejection of claims 1-4, 6-15, 17-21, and 23-29, the appellant argues that there is no express disclosure of parallel folding in Giwa. The appellant further argues that the "Cell Construction" section of Giwa is ambiguous, and the "parallel folding" feature is not inherently disclosed. The appellant further argues that "there are at least several possible understanding that may be gleaned from Giwa's folding-related disclosure" by first showing a zig-zag electrode structure that is 240 x 7.5 cm that is folded 5 times with the length of each fold being 40 cm corresponding to a fold size of 40 x 7.5 cm and then showing how the parallel folding of the present claims is different because each fold is a different size. Finally, the appellant argues that the Examiner's interpretation of Giwa relies solely on the hindsight gleaned from Applicant's disclosure and not the necessary, inevitable presence of information in Giwa.

The following explanation will show that the only logical method of forming the folded structure taught by Giwa et al is the parallel folding feature recited in the

appealed claims, wherein the overall length of the stacked structure is halved at each fold:

Giwa et al discloses "The cells used a folded construction with each fold being 7.5 x 7.5 cm" and "The cells were folded successively, from 1 to 5 times giving active areas of 15 x 7.5 cm up to 240 x 7.5 cm".

Contrary to the appellant's argument that the first sentence contradicts the second sentence, it will become apparent that these two sentences when analyzed together do in fact disclose the parallel folding feature recited in the appealed claims.

It is clear from the disclosure of Giwa et al that the "folded construction" is the final structure of the folded cell with "each fold" or folded section having a length of 7.5 cm. In other words, a cell with an initial length of 15 cm that is folded once will necessarily be folded such that its initial length is halved at each fold in order for the folded section to have a length of 7.5 cm. This is consistent with the teachings of Giwa et al of a cell that is folded 1 time giving an initial length of 15 cm. To further support this analysis of Giwa et al, an example of a cell that is folded 5 times will be analyzed herein. As disclosed by Giwa et al, a cell that is folded 5 times has an initial length of 240 cm. After the first fold, the length of the folded cell is 120 cm. After the second fold, the length of the folded cell is 60 cm. After the third fold, the length of the folded cell is 30 cm. After the fourth fold, the length of the folded cell is 15 cm. After the fifth fold, the length of the folded cell is 7.5 cm. Therefore, the final folded cell after being folded 5 times has folded sections that each have a length of 7.5 cm which means that "each fold" has a length of 7.5 cm. In addition, the zig-zag electrode structure shown by

the appellant has a final length of 40 cm which is inconsistent with the teaching of Giwa et al. In conclusion, it is clear based upon this analysis that the only logical method of forming a 5 times folded cell with each folded section being 7.5 cm in length and an initial length of 240 cm is the parallel folding feature recited in the appealed claims, wherein the overall length is halved at each fold.

Regarding the 103 rejection of claims 16 and 30, the appellant argues that Aamodt does not teach a double sided lithium anode in the form of a mesh or grid with lithium foil occupying the openings thereof. The examiner disagrees because a current collector in the form of a metal grid that reinforces two lithium foils essentially forms a double sided lithium anode in the form of a mesh or grid with lithium foil occupying the openings thereof.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Tony Chuo

Tony Chuo

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Conferees:

Patrick Ryan

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